WHAT IS CLAIMED IS:

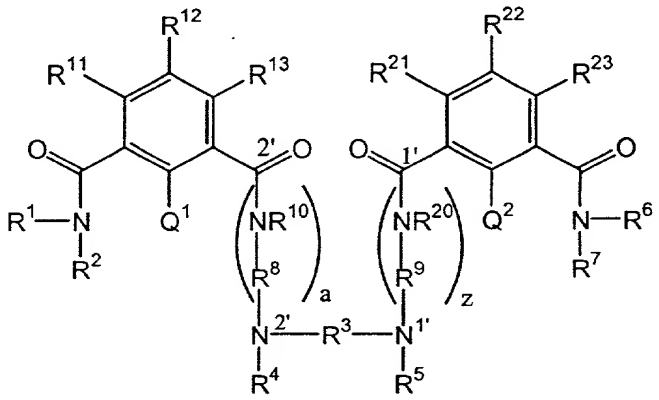
1. A luminescent lanthanide metal chelate comprising a metal ion of the lanthanide series and a complexing agent comprising at least one phthalamidyl moiety.

2. The chelate according to claim **1**, having a quantum yield of at least about 0.1.

3. The chelate according to claim **2**, wherein said lanthanide metal ion is an ion a member selected from europium, terbium and combinations thereof.

4. The compound according to claim **1**, further comprising at least one salicylamidyl moiety.

5. A compound having a structure according to Formula I:



(I)

wherein,

R^1, R^2, R^4, R^5, R^6, R^7, R^{10} and R^{20} are members independently selected from the group consisting of H, alkyl and substituted alkyl groups,

wherein, two or more of R^2, R^4, R^5, R^7 and, when R^3 is substituted alkyl, a substituent of R^3 are optionally adjoined by at least one linker moiety to form at least one ring;

R^3, R^8 and R^9 are members independently selected from the group consisting of alkyl, substituted alkyl, aryl and substituted aryl groups;

R^{11}, R^{12}, R^{13}, R^{21}, R^{22} and R^{23} are members independently selected from alkyl, substituted alkyl, H, $—NR^{14}R^{15}$, $—NO_2$, $—OR^{16}$, $—COOR^{17}$,

wherein, R^{14}, R^{15}, R^{16} and R^{17} are members independently selected from the group consisting of H, alkyl and substituted alkyl, wherein R^{12} can optionally form a ring with R^{11}, R^{13} or both, and R^{22} can optionally form a ring with R^{21}, R^{23} or both, said rings being members independently selected from the group of ring systems consisting of cyclic alkyl, substituted cyclic alkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocyclyl and saturated heterocyclyl ring systems; and

Q^1 is —OR^{18};

Q^2 is —OR^{19},

wherein R^{18} and R^{19} are members independently selected from H, an enzymatically labile group, a hydrolytically labile group and a single negative charge;

a is 0 or 1, with the proviso that when a is 0, $N^{2'}$ is covalently attached directly to carbonyl group 2'.

z is 0 or 1, with the proviso that when z is 0, $N^{1'}$ is covalently attached directly to carbonyl group 1'.

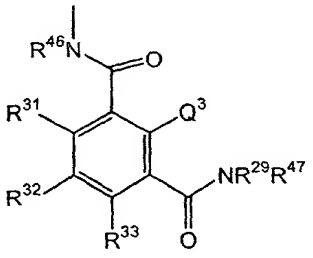
6. The compound according to claim **4**, wherein z is 0.

7. The compound according to claim **5**, wherein R^3 is a linear C_1-C_6 hydrocarbon.

8. The compound according to claim **6**, wherein

R^8 is $(CH_2)_P$;

R^4 is an alkyl group substituted with a moiety having a structure according to Formula II:



(II)

wherein,

R^{29}, R^{46} and R^{47} are members independently selected from the group consisting of H, alkyl and substituted alkyl groups, wherein, two or more of R^2, R^7 and R^{29} are optionally adjoined by at least one linker moiety to form at least one ring

R^{31}, R^{32} and R^{33} are members independently selected from alkyl, substituted alkyl, H, —$NR^{24}R^{25}$, —NO_2, —OR^{26}, —$COOR^{27}$,

wherein, R^{24}, R^{25}, R^{26} and R^{27} are members independently selected from the group consisting of H, alkyl and substituted alkyl, wherein R^{32} can optionally form a ring with R^{31}, R^{33} or both, said rings being members independently selected from the group of ring systems consisting of cyclic alkyl, substituted cyclic alkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocyclyl and saturated heterocyclyl ring systems;

R^3 is $(CH_2)_X$;

Q^3 —OR^{28}, wherein R^{28} is a member selected from H, an enzymatically labile group, a hydrolytically labile group and a single negative charge;

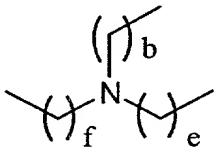
P and X are members independently selected from the group consisting of the integers from 1 to 5, inclusive;

and z is 0.

9. The compound according to claim **8**, wherein two or more of R^2, R^7 and R^{29} are adjoined by at least one linker moiety to form at least one ring.

10. The compound according to claim **8**, wherein R^2, R^6 and R^{29} together comprise a single linker moiety.

11. The compound according to claim **10**, wherein said linker moiety has a structure according to Formula III :

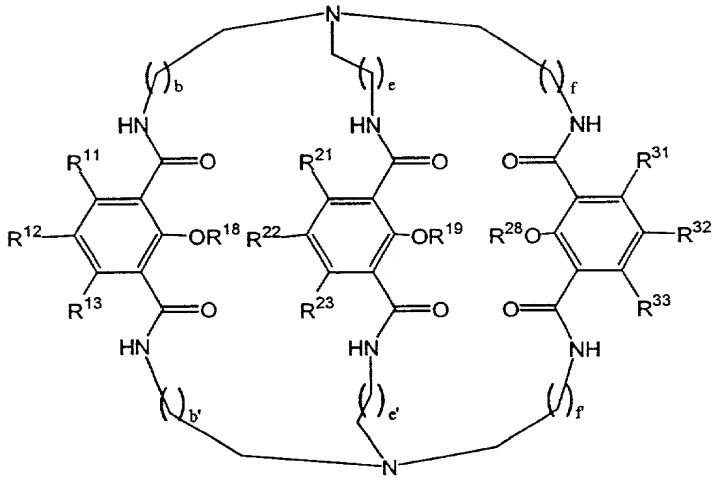


(III)

wherein,

b, e and f are members independently selected from the group consisting of the integers from 1 to 5, inclusive.

12. A compound according to claim **11**, having a structure according to Formula IV:

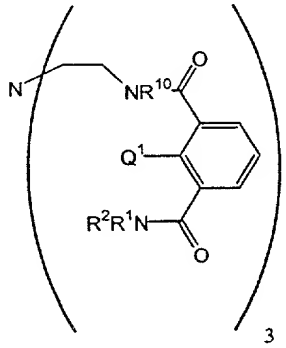


(IV)

wherein,

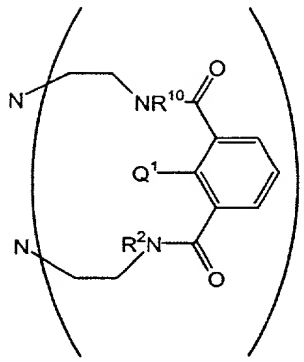
b, b', e, e', f and f' are members independently selected from the group consisting of the integers from 1 to 5, inclusive.

13. A compound according to claim **8**, having a structure according to Formula V:



(V).

14. The compound according to claim **13**, having a structure according to Formula VI:



(VI).

15. The compound according to claim **8** wherein, R^1, R^2, R^3, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{29}, R^{46} and R^{47} are members independently selected from the group consisting of H, C_1 to C_{10} alkyl and C_1 to C_{10} substituted alkyl.

16. The compound according to claim **15** wherein, R^1, R^2, R^3, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{29}, R^{46} and R^{47} are members independently selected from the group consisting of H, C_2 to C_6 alkyl and C_2 to C_6 substituted alkyl.

17. The compound according to claim **8**, wherein R^1, R^2, R^3, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{29}, R^{46} and R^{47} are members independently selected from the group consisting of H, aryl, substituted aryl and combinations thereof.

18. The compound according to claim **8**, wherein R^1, R^2, R^3, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{29}, R^{46} and R^{47} are members independently selected from the group consisting of H and alkyl substituted with polycyclic aryl groups.

19. The compound according to claim **8**, wherein a member selected from the group consisting of R^1, R^2, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{29}, R^{46} and R^{47} and combinations thereof is a primary alkyl amine.

20. The compound according to claim **19**, wherein said primary alkyl amine is a C_1 to C_{10} alkyl chain bearing an amine moiety at the ω-position.

21. The compound according to claim **20**, wherein said primary alkyl amine as a C_2 to C_6 alkyl chain bearing an amine moiety at the ω-position.

22. The compound according to claim **8**, wherein a member selected from the group consisting of R^1, R^2, R^3, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{29}, R^{46} and R^{47} and combinations thereof is a polyether.

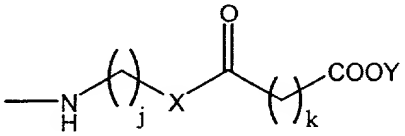
23. The compound according to claim **22**, wherein said polyether is a member selected from ethylene glycol, ethylene glycol oligomers and combinations thereof, wherein said polyether has a molecular weight of from about 60 daltons to about 10,000 daltons.

24. The compound according to claim **23**, wherein said polyether has a molecular weight of from about 100 daltons to about 1,000 daltons.

25. The compound according to claim **8**, wherein a member selected from the group consisting of R^1, R^2, R^3, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{29}, R^{46} and R^{47} comprise a reactive group for conjugating said compound to a member selected from the group consisting of molecules and surfaces.

26. The compound according to claim **8**, wherein R^1, R^2, R^3, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{29}, R^{46} and R^{47} and combinations thereof are members selected from ω-carboxyl alkyl groups, ω-carboxyl substituted alkyl groups and combinations thereof.

27. The compound according to claim **26**, wherein said ω-carboxyl substituted alkyl group has a structure according to Formula VII:



(VII)

wherein,

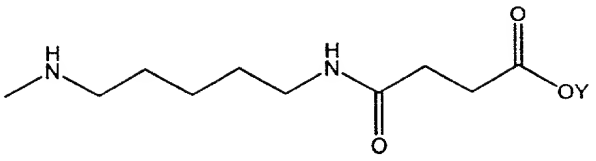
X is a member selected from O, S and NR^{50}, wherein

R^{50} is a member selected from H, alkyl and substituted alkyl;

Y is a member selected from H and a single negative charge; and

j an k are members independently selected from the group consisting of integers from 1 to 18.

28. The compound according to claim **27**, wherein said ω-carboxyl substituted alkyl group has a structure according to Formula VIII:

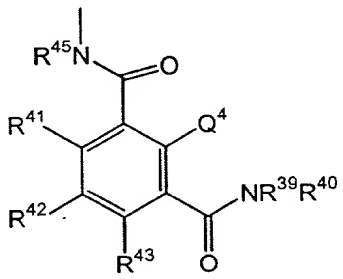


(VIII).

29. The compound according to claim **8**, wherein R^1, R^2, R^5, R^6, R^7, R^{10}, R^{29}, R^{46} and R^{47} are H.

30. The compound according to claim **5**, wherein R^4 is an alkyl group substituted with a group having a structure according to Formula II;

R^5 is an alkyl group substituted with a moiety having a structure according to Formula IX:



(IX)

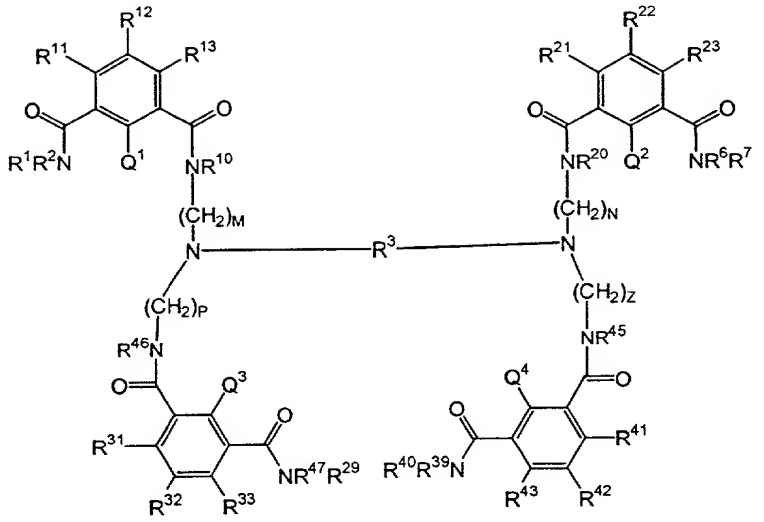
wherein,

R^{39}, R^{40} and R^{45} are members independently selected from alkyl and substituted alkyl groups; and

R^{41}, R^{42} and R^{43} are members independently selected from alkyl, substituted alkyl, H, —$NR^{34}R^{35}$, —NO_2, —OR^{36}, —$COOR^{37}$,

wherein, R^{34}, R^{35}, R^{36} and R^{37} are members independently selected from the group consisting of H, alkyl and substituted alkyl, wherein R^{42} can optionally form a ring with R^{41}, R^{43} or both, said rings being members independently selected from the group of ring systems consisting of cyclic alkyl, substituted cyclic alkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocyclyl and saturated heterocyclyl ring systems.

31. A compound according to claim **30**, having a structure according to Formula X:



(X)

wherein,

M, N, P and Z are members independently selected from the group consisting of the integers between 1 and 5, inclusive.

32. The compound according to claim **31**, wherein, R^1, R^2, R^3, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{20}, R^{29}, R^{39}, R^{40}, R^{45}, R^{46} and R^{47} are members independently selected from the group consisting of C_1 to C_{10} alkyl and C_1 to C_{10} substituted alkyl.

33. The compound according to claim **32** wherein, R^1, R^2, R^3, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{20}, R^{29}, R^{39}, R^{40}, R^{45}, R^{46} and R^{47} are members independently selected from the group consisting of C_2 to C_6 alkyl and C_2 to C_6 substituted alkyl.

34. The compound according to claim **31**, wherein R^1, R^2, R^3, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{20}, R^{29}, R^{39}, R^{40}, R^{45}, R^{46} and R^{47} are members independently selected from the group consisting of aryl, substituted aryl and combinations thereof.

35. The compound according to claim **31**, wherein R^1, R^2, R^3, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{20}, R^{29}, R^{39}, R^{40}, R^{45}, R^{46} and R^{47} are members independently selected from the group consisting of alkyl substituted with polycyclic aryl groups.

36. The compound according to claim **31**, wherein a member selected from the group consisting of R^1, R^2, R^5, R^6, R^7, R^8, R^9, R^{10}, R^{20}, R^{29}, R^{39}, R^{40}, R^{45}, R^{46} and R^{47} and combinations thereof is a primary alkyl amine.

37. The compound according to claim **31**, wherein said primary alkyl amine as a C_1 to C_{10} alkyl chain bearing an amine moiety at the ω-position.

38. The compound according to claim **37**, wherein said primary alkyl amine as a C_2 to C_6 alkyl chain bearing an amine moiety at the ω-position.

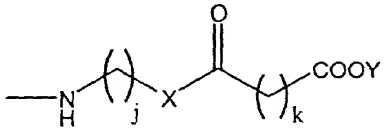
39. The compound according to claim **31**, wherein a member selected from the group consisting of R^1, R^2, R^6, R^7, R^{10}, R^{20}, R^{29}, R^{39}, R^{40}, R^{45}, R^{46} and R^{47} and combinations thereof is a polyether.

40. The compound according to claim **39**, wherein said polyether is a member selected from ethylene glycol, ethylene glycol oligomers and combinations thereof, wherein said polyether has a molecular weight of from about 60 daltons to about 10,000 daltons.

41. The compound according to claim **39**, wherein said polyether has a molecular weight of from about 100 daltons to about 1,000 daltons.

42. The compound according to claim **31**, wherein R^1, R^2, R^6, R^7, R^{10}, R^{20}, R^{29}, R^{39}, R^{40}, R^{45}, R^{46} and R^{47} and combinations thereof are members selected from ω-carboxyl alkyl groups, ω-carboxyl substituted alkyl groups and combinations thereof.

43. The compound according to claim **42**, wherein said ω-carboxyl substituted alkyl group has a structure according to Formula VII:



(VII)

wherein,

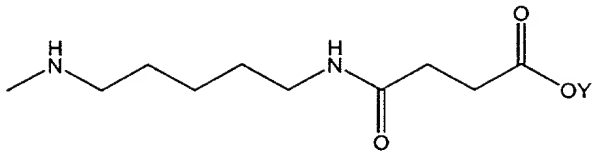
X is a member selected from O, S and NR^{50}, wherein

R^{50} is a member selected from H, alkyl and substituted alkyl;

Y is a member selected from H and a single negative charge; and

j an k are members independently selected from the group consisting of integers from 1 to 18.

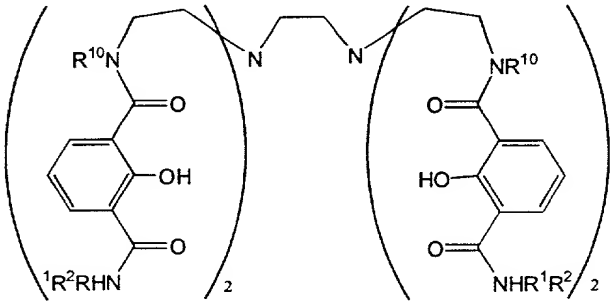
44. The compound according to claim **43**, wherein said ω-carboxyl substituted alkyl group has a structure according to Formula VIII:



(VIII).

45. The compound according to claim **31**, wherein R^1, R^2, R^6, R^7, R^{10}, R^{20}, R^{29}, R^{39}, R^{40}, R^{45}, R^{46} and R^{47} are H.

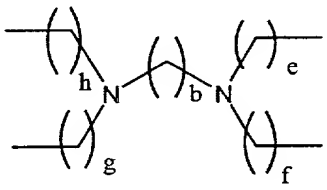
46. A compound according to claim **31**, having a structure according to Formula XI:



(XI).

47. The compound according to claim **30**, wherein R^1, R^6, R^{29} and R^{39} together comprise a single linker moiety.

48. The compound according to claim **47**, wherein said single linker moiety has a structure according to Formula XII:

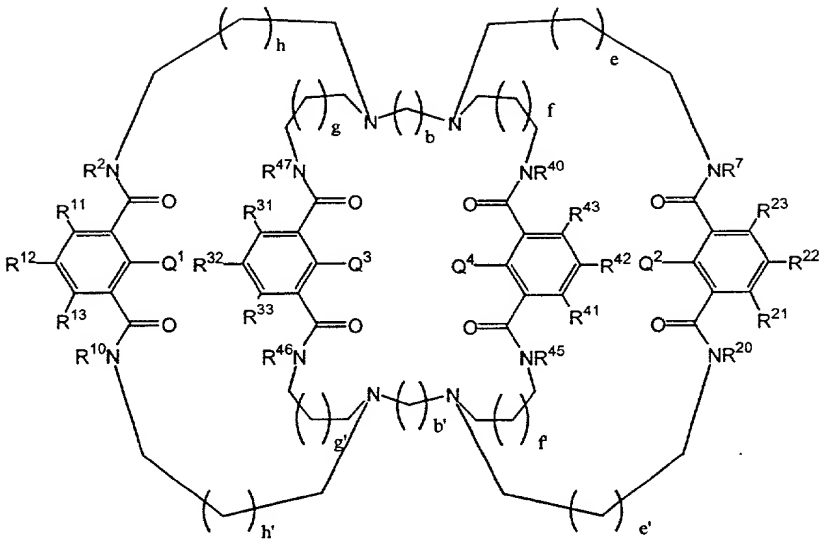


(XII)

wherein,

b, e, f, g and h are members independently selected from the numbers between 1 and 5, inclusive.

49. A compound according to claim **48**, having a structure according to Formula XIII:



(XIII)

wherein,

R^2, R^7, R^{10}, R^{20}, R^{40}, R^{45}, R^{46}, and R^{47} are members independently selected from the group consisting of H, alkyl and substituted alkyl;

R^{11}, R^{12}, R^{13}, R^{21}, R^{22}, R^{23}, R^{31}, R^{32}, R^{33}, R^{41}, R^{42} and R^{43} are members independently selected from alkyl, substituted alkyl, H, —$NR^{10}R^{11}$, —NO_2, —OR^{12}, —$COOR^{13}$, or two or more of R^5, R^6 and R^7 are joined to form a ring system, which is a member selected from cyclic alkyl, substituted cyclic alkyl, aryl, substituted aryl, heteroaryl, substituted heteroaryl, heterocyclyl and saturated heterocyclyl systems;

Q^1, Q^2, Q^3 and Q^4 are OR^{18}, OR^{19}, OR^{28}, OR^{38}, respectively, wherein, R^{18}, R^{19}, R^{28} and R^{38} are members independently selected from H, and a single negative charge;

b and b' are members independently selected from the group consisting of the integers from 1 to 5, inclusive; and

e, e', f, f', g, g', h and h' are members independently selected from the group consisting of numbers from 0 to 3.

50. The compound according to claim **49** wherein, R^2, R^7, R^{10}, R^{20}, R^{40}, R^{45}, R^{46}, and R^{47} are members independently selected from the group consisting of C_1 to C_{10} alkyl and C_1 to C_{10} substituted alkyl.

51. The compound according to claim **50** wherein, R^2, R^7, R^{10}, R^{20}, R^{40}, R^{45}, R^{46}, and R^{47} are members independently selected from the group consisting of C_2 to C_6 alkyl and C_2 to C_6 substituted alkyl.

52. The compound according to claim **49**, wherein R^2, R^7, R^{10}, R^{20}, R^{40}, R^{45}, R^{46}, and R^{47} are members independently selected from the group consisting of aryl, substituted aryl and combinations thereof.

53. The compound according to claim **52**, wherein R^2, R^7, R^{10}, R^{20}, R^{40}, R^{45}, R^{46}, and R^{47} are members independently selected from the group consisting of alkyl substituted with polycyclic aryl groups.

54. The compound according to claim **49**, wherein a member selected from the group consisting of R^2, R^7, R^{10}, R^{20}, R^{40}, R^{45}, R^{46}, and R^{47} and combinations thereof is a primary alkyl amine.

55. The compound according to claim **54**, wherein said primary alkyl amine as a C_1 to C_{10} alkyl chain bearing an amine moiety at the ω-position.

56. The compound according to claim **55**, wherein said primary alkyl amine as a C_2 to C_6 alkyl chain bearing an amine moiety at the ω-position.

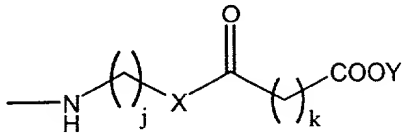
57. The compound according to claim **49**, wherein a member selected from the group consisting of R^2, R^7, R^{10}, R^{20}, R^{40}, R^{45}, R^{46}, and R^{47} and combinations thereof is a polyether.

58. The compound according to claim **57**, wherein said polyether is a member selected from ethylene glycol, ethylene glycol oligomers and combinations thereof, wherein said polyether has a molecular weight of from about 60 daltons to about 10,000 daltons.

59. The compound according to claim **58**, wherein said polyether has a molecular weight of from about 100 daltons to about 1,000 daltons.

60. The compound according to claim **49**, wherein R^2, R^7, R^{10}, R^{20}, R^{40}, R^{45}, R^{46}, and R^{47} and combinations thereof are members selected from ω-carboxyl alkyl groups, ω-carboxyl substituted alkyl groups and combinations thereof.

61. The compound according to claim **60**, wherein said ω-carboxyl substituted alkyl group has a structure according to Formula VII:



(VII)

wherein,

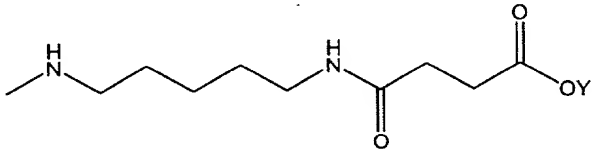
X is a member selected from O, S and NR^{50}, wherein

R^{50} is a member selected from H, alkyl and substituted alkyl;

Y is a member selected from H and a single negative charge; and

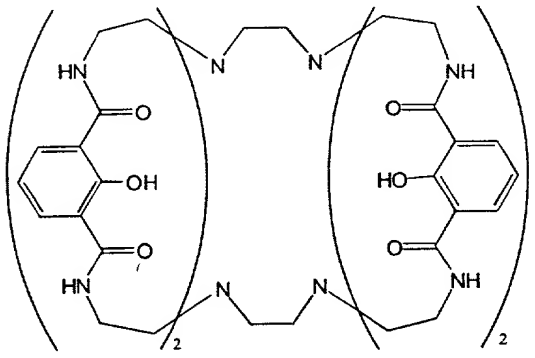
j an k are members independently selected from the group consisting of integers from 1 to 18.

62. The compound according to claim **61**, wherein said ω-carboxyl substituted alkyl group has a structure according to Formula VIII:



(VIII).

63. The compound according to claim **49**, having a structure according to Formula XIV:



(XIV)

64. The compound according to claim **5**, wherein said compound is covalently attached to a carrier molecule.

65. The compound according to claim **64**, wherein said carrier molecule is a member selected from the group consisting of small molecular bioactive agents, synthetic polymers and biomolecules.

66. The compound according to claim **65**, wherein said biomolecule is a member selected from the group consisting of antibodies, antigens, peptides, nucleic acids, enzymes, haptens, carbohydrates and pharmacologically active agents.

67. A complex formed between a metal ion and the compound according to claim **5**.

68. The complex according to claim **67**, wherein said complex emits luminescence.

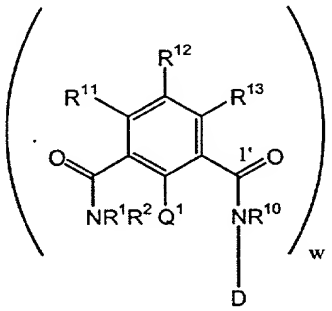
69. The complex according to claim **71**, wherein said luminescence is circularly polarized luminescence.

70. The complex according to claim **67**, wherein said luminescence is produced by electrochemical excitation of said complex.

71. The complex according to claim **67**, wherein said metal ion is an ion of the lanthanide series.

72. The complex according to claim **71**, wherein said lanthanide ion is a member selected from the group consisting of terbium, samarium, europium, dysprosium and neodymium.

73. The compound according to claim **5**, having a structure according to Formula XV:



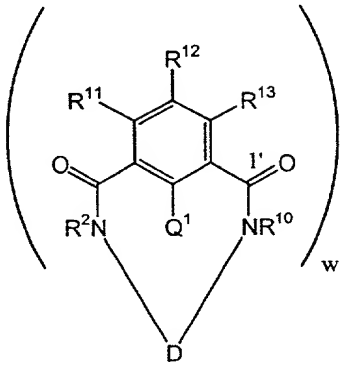
(XV)

wherein,

D is a dendrimer; and

w is a member selected from the group consisting of the integers from 4 to 100, inclusive.

74. The compound according to claim **73**, wherein said compound has a structure according to Formula XVI:



(XVI)

75. The compound according to claim **73**, wherein said dendrimer is a poly(propyleneimine) dendrimer.

76. The compound according to claim **73**, wherein said dendrimer is of a generation selected from the group consisting of generation 2 to generation 10, inclusive.

77. The compound according to claim **73**, wherein w is a member selected from the group consisting of the integers between 8 and 50, inclusive.

78. The complex according to claim **5**, wherein said compound is covalently attached to a carrier molecule.

79. The compound according to claim **78**, wherein said carrier molecule is a member selected from the group consisting of synthetic polymers and biomolecules.

80. The compound according to claim **79**, wherein said biomolecule is a member selected from the group consisting of antibodies, antigens, peptides, nucleic acids, enzymes, haptens, carbohydrates and pharmacologically active agents.

81. A method for determining whether a sample contains an enzyme, said method comprising:

(a) contacting said sample with a peptide construct comprising

i) a complex according to claim **67**;

ii) a quencher of light energy having an absorbance band overlapping an emission band of said complex; and

iii) a cleavage recognition site for said enzyme,

wherein said peptide is in a conformation allowing fluorescence energy transfer between said complex and said quencher when said complex is excited;

(b) exciting said complex; and

(c) determining a fluorescence property of said sample, wherein the presence of said enzyme in said sample results in a change in said fluorescence property.

82. A method for determining whether a compound alters an activity of an enzyme, said method comprising:

(a) contacting a sample comprising said enzyme and said compound with a peptide construct comprising

i) a complex according to claim **67**;

ii) a quencher of light energy having an absorbance band overlapping an emission band of said complex; and

iii) a cleavage recognition site for said enzyme,

wherein said peptide is in a conformation allowing fluorescence energy transfer between said complex and said quencher when said complex is excited;

(b) exciting said complex; and

(c) determining a fluorescence property of said sample, wherein said activity of said enzyme in said sample results in a change in said fluorescence property.

83. A method for detecting a nucleic acid target sequence, said method comprising:

(a) contacting said target sequence with a detector oligonucleotide comprising a single-stranded target binding sequence, said detector oligonucleotide having linked thereto,

i) a complex according to claim **67**;

ii) a quencher of light energy having an absorbance band overlapping an emission band of said complex,

wherein said detector nucleic acid is in a conformation allowing fluorescence energy transfer between said complex and said quencher when said complex is excited;

(b) hybridizing said target binding sequence to said target sequence, thereby altering said conformation of said detector oligonucleotide, causing a change in a fluorescence parameter; and

(c) detecting said change in said fluorescence parameter, thereby detecting said nucleic acid target sequence.

84. The method according to claim **83**, wherein said detector oligonucleotide has a format selected from molecular beacons, scorpion probes, sunrise probes, light up probes and TaqMan™ probes.

85. A method for detecting the presence of a nucleic acid target sequence, said method comprising:

(a) hybridizing to said target sequence a detector oligonucleotide comprising a single-stranded target binding sequence and an intramolecularly associated secondary structure 5' to said target binding sequence, wherein at least a portion of the target sequence forms a single stranded tail which is available for hybridization to said target sequence,

said detector oligonucleotide having linked thereto,

i) a complex according to claim **67**;

ii) a quencher of light energy having an absorbance band overlapping an emission band of said complex,

wherein said detector nucleic acid is in a conformation allowing fluorescence energy transfer between said complex and said quencher when said complex is excited;

(b) in a primer extension reaction, synthesizing a complementary strand using said intramolecularly associated secondary structure as a template, thereby dissociating said intramolecularly associated secondary structure and producing a change in a fluorescence parameter;

(c) detecting said change in said fluorescence parameter, thereby detecting said nucleic acid target sequence.

86. The method according to claim **85**, wherein said intramolecularly associated secondary structure is a member selected from hairpins, stem-loop structures, pseudoknots, triple helices and conformationally assisted structures.

87. The method according to claim **85**, wherein said complementary strand is synthesized in a target amplification reaction.

88. The method according to claim **85**, wherein said complementary strand is synthesized by extension of the target sequence using said detector oligonucleotide as a template.

89. The method according to claim **85**, wherein the intramolecularly associated secondary structure comprises a totally or partially single-stranded endonuclease recognition site.

90. The method according to claim **85**, wherein said change in fluorescence is detected as an indication of the presence of said target sequence.

91. The method according to claim **85**, wherein said fluorescence parameter is detected in-real time.

92. The method according to claim **85**, wherein said intramolecularly base-paired secondary structure comprises a portion of said target binding sequence.

93. A method for detecting amplification of a target sequence comprising, in an amplification reaction:

(a) hybridizing to said target sequence a detector oligonucleotide comprising a single-stranded target binding sequence and an intramolecularly associated secondary structure 5' to said target binding sequence, wherein at least a portion of said target sequence forms a single stranded tail which is available for hybridization to said target sequence, said detector oligonucleotide having linked thereto,

i) a complex according to claim **67**;

ii) a quencher of light energy having an absorbance band overlapping an emission band of said complex,

wherein said detector nucleic acid is in a conformation allowing fluorescence energy transfer between said complex and said quencher when said complex is excited;

(b) extending said hybridized detector oligonucleotide on said target sequence with a polymerase to produce a detector oligonucleotide extension product and separating said detector oligonucleotide extension product from said target sequence;

(c) hybridizing a primer to said detector oligonucleotide extension product and extending the primer with said polymerase, thereby linearizing said intramolecularly associated secondary structure and producing a change in a fluorescence parameter; and

(d) detecting said change in said fluorescence parameter, thereby detecting said target sequence.

94. The method according to claim **93**, wherein said target sequence is amplified by a method selected from Strand Displacement Amplification, Polymerase Chain Reaction 3SR, TMA and NASBA.

95. The method according to claim **93**, wherein said secondary structure further comprises a partially or entirely single-stranded restriction endonuclease site.

96. The method according to claim **93**, wherein a change in fluorescence intensity is detected.

97. The method according to claim **96**, wherein said change in fluorescence intensity is detected in real-time.

98. The method according to claim **93**, wherein said intramolecularly base-paired secondary structure comprises a portion of said target binding sequence.

99. A method of ascertaining whether a first nucleic acid and a second nucleic acid hybridize, said first nucleic acid comprising a complex according to claim **67**, said method comprising:

(a) contacting said first nucleic acid with said second nucleic acid;

(b) detecting an alteration in a fluorescent property of a member selected from said first nucleic acid, said second nucleic acid and a combination thereof, thereby ascertaining whether said hybridization occurs.

100. The method according to claim **99**, wherein said second nucleic acid comprises a quencher of light energy covalently attached thereto.

101. A microarray comprising a complex according to claim **67**, said quencher being conjugated directly to a solid support or to a carrier molecule attached to said solid support.

102. The microarray according to claim **101**, wherein said carrier molecule is a member selected from a nucleic acid, a peptide, a peptide nucleic acid and combinations thereof.

103. The microarray according to claim **101**, wherein said solid support is divided into a first region and a second region, said first region having attached thereto a first said complex attached to a first carrier molecule and said second region having attached thereto a second said complex attached to a second carrier molecule.

104. The microarray according to claim **103**, wherein said first and second carrier molecules are members independently selected from nucleic acids, peptides and peptide nucleic acids.

105. The microarray according to claim **103**, wherein said first said quencher of light energy and said second complex have different structures.

106. A method of probing a microarray for the presence of a compound, said method comprising:

(a) contacting said microarray with a probe interacting with said compound, said probe comprising a complex according to claim **67**;

(b) detecting a difference in a fluorescence property of a member selected from said probe, said compound and combinations thereof, thereby ascertaining the presence of said compound.

107. The method according to claim **106**, wherein said compound is a member selected from nucleic acids, peptide, peptide nucleic acids and combinations thereof.

108. A method of providing radiation therapy to a subject harboring a growth requiring such therapy, said method comprising:

administering to said subject a complex according to claim **67**, said complex having radiosensitization properties; and

administering ionizing radiation to the host in proximity to the growth, thereby providing radiation therapy to said subject.

109. A method for photodynamic therapy of a lesion or of a lesion obscured by melanodermic tissue of a subject, said method comprising:

(a) administering a photosensitive complex according to claim **67** to the subject; and

(b) photoirradiating the lesion.

110. The method according to claim **109**, wherein said photoirradiating is with light having a wavelength range of about 700 to about 900 nanometers.

111. The method of claim **110** wherein the photoirradiating is with light having a wavelength range of about 730 to about 770 nanometers.

112. The complex according to claim **67**, wherein said compound comprises a component of an ink or a dye.

113. The complex according to claim **67**, wherein said complex comprises a component of a substrate for the transmission and amplification of light.

114. The complex according to claim **113**, wherein said substrate comprises a member selected from glass, organic polymers, inorganic polymers and combinations thereof.

115. A method for amplifying light transmitted by a substrate, said method comprising transmitting light through a substrate according to claim **113**, thereby amplifying said light.

116. A method of performing a fluorescence assay of an analyte, said method comprising:

(a) displacing with said analyte a binding partner from a binding partner-recognition moiety complex, thereby forming an analyte-recognition moiety complex and a free binding partner, said binding partner and said free binding partner comprising a compound according to claim **5**;

(b) forming a fluorescent complex between a lanthanide ion and a member selected from the group consisting of said binding partner, said free binding partner and combinations thereof; and

(c) detecting said fluorescent complex.

117. The method according to claim **116**, wherein said recognition moiety, said binding partner and said analyte are members independently selected from the group consisting of bioactive materials, biomolecules and combinations thereof.

118. The material according to claim **117**, wherein said biomolecule is a member selected from the group consisting of haptens, antibodies, antigens, carbohydrates, nucleic acids, peptides, enzymes and receptors.

119. The method according to claim **116**, wherein one or more members selected from the group consisting of said recognition moiety, said binding partner and said analyte are attached to a surface.

120. The method according to claim **116**, wherein said fluorescent complex is formed prior to displacing said binding partner from said binding partner-recognition moiety complex.

121. The method according to claim **116**, wherein said fluorescent complex is formed after displacing said binding partner from said binding partner-recognition moiety complex.

122. The method according to claim **116**, further comprising, separating said free binding partner from a member of the group consisting of said recognition-binding partner pair, said analyte-recognition moiety pair and combinations thereof.

123. The method according to claim **122**, wherein said fluorescent complex is formed following said separation.